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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/605,657	06/28/2000	Mandeep Singh	PM 271437 P-0150.030-US	6299

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EXAMINER

NGUYEN, HUNG

ART UNIT PAPER NUMBER

2851

DATE MAILED: 10/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/605,657

Applicant(s)

SINGH ET AL.

Examiner

Hung Henry V Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10 and 14-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 41-42, 44 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10 and 14-40 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Prosecution Status*

1. This office action is non-final since the Examiner has advanced new rejection under 35 U.S.C. 112, second paragraph.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-8, 10, 14-19, 21, 39, 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 1, 15, 21, 39, and 43, the claims appear to be Markush claims and the recitation of "wherein said relatively inert material is selected from the group comprising: diamond-like carbon, Ru, Rh, B, TiN, MaF<sub>2</sub>, LiF, C<sub>2</sub>F<sub>4</sub> and compounds and alloys thereof" (see claim 1 for example) renders the claims indefinite. This alternative expression is not permitted because it presents ambiguity with respect to the question of scope or clarity of the claims. The applicant is reminded that one acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C." See *Ex parte Markush*, 1925 C.D. 126.

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***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 10, 14-40 are rejected under 35 U.S.C. 103(a) as being unpatentable Mori et al (U.S.Pat. 6,268,904) in view of Montcalm et al (U.S.Pat. 5,958,605).

With regard to claims 1-8, 10, 14-40, Mori et al discloses a projection optical system comprising substantially all basic features of the instant claims such as: an illumination optical systems (10-30) for supplying a projection beam of radiation; a reticle stage for holding a reticle (20); a wafer stage (23) for holding a wafer (22); a projection optical system (21) for projecting a predetermined pattern formed on the mask onto the wafer (see fig.1). Mori does not expressly disclose at least one of the optical elements in the illumination optical system or in the projection optical system such as a sensor or a lens or a reflector having a surface which is coated by a "relatively inert material" capping layer such as "diamond like carbon, boron nitride, boron carbide, silicon nitride, silicon carbide, B, Pd, Ru, Rh, Au,  $\text{MgF}_2$ , LiF,  $\text{C}_2\text{F}_4$ , TiN, and compounds and alloys thereof". Montcalm et al discloses an extreme ultraviolet projection lithography apparatus having optical elements with a "relatively inert material" reflective capping layers deposited for the purpose of preventing oxidation and corrosion thereby improving the EUV optical performance" (see col.1, lines 20 thru col.2, line 24). Montcalm et al further teaches the inert materials including "molybdenum-silicon, molybdenum carbide-silicon, molybdenum-beryllium and molybdenum carbide-beryllium or carbon and palladium, or

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**compound material**, such as carbides, borides, nitrides and oxides. "Specific examples include molybdenum carbide, boron carbide, ... boron nitride, ... and silicon oxide (see col.2, lines 4-24) and the thickness of the layer is in the range of 0.5 to 5nm and the wavelength range of the projection beam is from 11.2 to 12nm (see col.2, lines 25-36). This provides a concrete evidence that it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teachings of Mori et al and Montcalm to obtain the invention as claimed. It would have been obvious to a skilled artisan to provide optical elements such as a sensor or reflector with protective capping layer consisting of "diamond like carbon, boron nitride, boron carbide, silicon nitride, silicon carbide, B, Pd, Ru, Rh, Au,  $\text{MaF}_2$ ,  $\text{LiF}$ ,  $\text{C}_2\text{F}_4$ ,  $\text{TiN}$ , and compounds and alloys thereof" into the exposure apparatus of Mori for the purpose of preventing "oxidation and corrosion thereby improving the EUV optical performance" as suggested by Montcalm.

In addition, it has been held that where general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Also, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

#### ***Allowable Subject Matter***

5. Claims 41-42 and 44 are allowed.

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6. Claim 43 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record either alone, or in combination, neither discloses nor makes obvious a combination of a lithographic projection apparatus where at least one of the illumination system and projection system with an optical element comprising a reflector having particular structures satisfying conditions as recited in the instant claims of the present invention.

#### ***Response to Arguments***

5. Applicant's amendments filed July 26, 2002 have been entered. Claims 9, 11-13 have been cancelled. Claims 1 and 15 have been amended. New claims 20-44 have been added. Turning to the art rejection, Applicant's arguments have been carefully considered but they are not found persuasive.

The applicant is reminded that the claimed subject matter to examination will be given their broadest reasonable interpretation consistent with the specification, and limitations appearing in the specification are not be read into the claims. In re Yamamoto, 740 F. 2d 1569, 1571, 222 USPO 934, 936 (Fed.Cir. 1984). With this in mind, the discussion herein will focus on how the terms and relationships thereof in the claims are met by the references. Response to any limitation that is not in the claims or any argument that is irrelevant to or does not relate to any specific claimed language will not be warranted.

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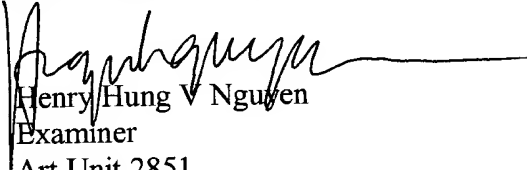
In response to applicant's arguments that Montcalm teaches capping materials such as carbon, palladium, carbides, borides, nitrides and oxides but fails to disclose the use of materials such as Boron, ruthenium, rhodium and fluorides such as  $\text{MgF}_2$ ,  $\text{LiF}$  and  $\text{C}_2\text{F}_4$ . The examiner respectfully disagrees with the applicant. The Applicant is reminded that the rejection is made under 35 U.S.C. 103(a). Therefore, firstly, the issue here is whether or not one of having ordinary skill in the art would incorporate the teachings of the applied references to come up with the instant invention. Applicant does not provide any persuasive arguments or evidences as to why the claimed subject matters would not have been obvious to one having ordinary skill in the art in view of the teachings of applied references. Secondly, Montcalm meets the limitation of "wherein said relatively inert material is selected from the group comprising: diamond like carbon, boron nitride, boron carbide, silicon nitride, silicon carbide, B, Pd, Ru, Rh, Au,  $\text{MaF}_2$ ,  $\text{LiF}$ ,  $\text{C}_2\text{F}_4$ ,  $\text{TiN}$ , and compounds and alloys thereof" (also, please see the rejection under 35 U.S.C. 112, second paragraph, supra) since Montcalm clearly suggests that capping material can be selected from the group of "boron nitride, boron carbide or compound materials" (see col.2, lines 17-24). With respect to claims 20 and 30, applicant argues that "Montcalm is silent about providing an optical element having its surface covered with a capping layer and where the optical element is used as a sensor element" or "said optical element is a reflector having a multilayer reflective coating". Again, the rejection here is 35 U.S.C. 103(a) rejection. Furthermore, one having ordinary skill in the art would understand that an optical element as taught by Montcalm can be a sensor (as specified in claim 20) or a reflector (as specified in claim 30) and having "multilayer coating" (see col.2, line 2-3 of Montcalm).

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry Hung V Nguyen whose telephone number is 703-305-6462. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703-308-2847

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

  
Henry Hung V Nguyen  
Examiner  
Art Unit 2851

hvn  
October 17, 2002